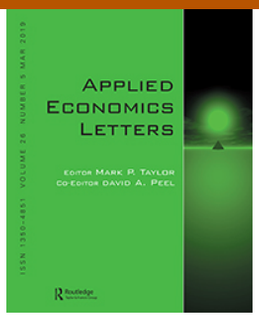

Applied Economics Letters

ISSN: 1350-4851 (Print) 1466-4291 (Online) Journal homepage: https://www.tandfonline.com/loi/rael20

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To cite this article: Christian Hopp & Alexander Speil (2019) Estimating the extent of deceitful behaviour using crosswise elicitation models, Applied Economics Letters, 26:5, 396-400, DOI: 10.1080/13504851.2018.1486007

To link to this article: https://doi.org/10.1080/13504851.2018.1486007

APPLIED ECONOMICS LETTERS
2019, VOL. 26, NO. 5, 396–400
https://doi.org/10.1080/13504851.2018.1486007

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ARTICLE

Estimating the extent of deceitful behaviour using crosswise elicitation models

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ABSTRACT

Eliciting deceitful behaviour is a daunting task. Respondents oftentimes conceal wrongdoings and refrain from truthfully responding to sensitive questions. In this work, we employ advancements in randomized response techniques to overcome the neglect of respondents to truthfully reveal deceitful behaviour. Our results report that the studied crosswise elicitation model reveals high levels of deceitful behaviour (around 60% admitted deceit by respondents). If respondents can be convincingly assured of their anonymity, the crosswise models (CMs) outperform several variants of elicitation techniques such as direct questioning and item-sum. We also emphasize the use of CMs to generalize findings from laborious experiments to larger populations.

KEYWORDS

Deceit; dishonest behaviour; misconduct; ethics; experimental methods; survey techniques

JEL CLASSIFICATION

A11; K30

I. Introduction

In his Nobel lecture, Joseph Stiglitz (2002) gives a narrative account of the history of economic thought and the trajectory it took to understand information in general, and information asymmetries in specific. Ever since the seminal works by Akerlof (1970), Stigler (1962), or Spence (1973) economists have studied the implications of the persistence of information asymmetries on individual and market behaviour. The impossibility to fully observe outcomes and effort provision creates incentives for agents to act deceitful. Implications of market structures that exacerbate information asymmetries among participants are profound, eventually leading to market failure (Akerlof 1970). Studies often elicit levels of deceitful behaviour through experimental designs (see Rosenbaum, Billinger, and Stieglitz 2014 for a meta-study). Yet, the extent of deceit admitted to hinges on the experimental design and consequently the extent of deceitful behaviour and the reported effects may vary (Mazar, Amir, and Ariely 2008; Gibson, Tanner, and Wagner 2013).

Instead of setting up experiments incentivizing participants to show cheating behaviour, we suggest simply surveying them regarding the extent of their cheating. If respondents can be convincingly assured of their anonymity, the trade-off between social desirability and rational deceit should be soothed, resulting in more answers that are truthful about deceitful behaviour.

II. Related literature

Our work is related to several streams of the literature that provide a benchmark against which we compare our findings regarding the admittance of cheating. We are questioning respondents regarding dishonest behaviour along two dimensions: soft and petty crime (undeserving money and fare dodging), and more fraudulent and consequential behaviour (plagiarism). Evidence on deceit regarding undeserved money lies somewhere in the range of some 70% (Rosenbaum, Billinger, and Stieglitz 2014) and 37% (Farrington and Kidd 1977). Related work on petty crimes (not returning letters with money) reveals similar ranges of dishonest behaviour (up to 50%) (Franzen and Pointner 2013). As related to fare dodging, the prevalence of deceitful behaviour regarding theft is around 63% (Gino and Pierce 2009). Lastly, we also elicited the extent of more risky fraudulent behaviour such as plagiarizing, where prior research found plagiarism prevalence rates of 20% (Dee and Jacob, 2012).

In the following, we suggest that asking respondents directly about the extent of their deceitful behaviour may reveal a similarly coherent picture

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and will outperform (e.g. report higher levels of deceit) many of the experimental designs found in the literature.

III. Methods

We sent out our questions to a sample group of students enrolled in an 'Introduction to business administration' class at an Austrian university.[1] In our work, we rely on several techniques to elicit dishonest behaviour in a survey sample. At first, we employ an item-sum (IS) technique. To measure the extent of deceit, respondents have to freely and openly admit to their misbehaviour. Consequently, we need to ensure full individual anonymity to overcome socially desirable responses. To assure this, the IS technique combines sensitive with innocuous questions (that need to be uncorrelated with the sensitive questions). Instead of answering each item separately, respondents are asked to provide the amount/count of statements applicable to them. The control group receives nonsensitive items only, while the treatment group gets an additional sensitive item. Both indicate how many of the answers (count measure) apply to them, resulting in no evident self-protection strategy (Trappmann et al. 2014). To provide a basis for comparison, we also ask both groups directly about their potential misbehaviour. It stands to reason that in the fully anonymous questioning technique individuals are more likely to admit to deceitful behaviour.

To extend the analysis further, we also complement the undeserving money/petty crime question with a crosswise model (CM). In the CM condition, a sensitive item is paired with an uncorrelated, nonsensitive one with a probability distribution that cannot be 50/50. Instead of the probability of a nonnegated question (p^w; Warner 1965) or a coin flip, we use the prevalence of the nonsensitive items. As such, the nonsensitive items act as a randomization device with a known distribution. In effect, pairing questions that are sensitive and insensitive in nature adds random noise to the responses. This means it is impossible to detect individual fallibility but allows statistically inferring the aggregate prevalence of wrongdoings and deceit in the sample.

For our CMs, these nonsensitive items are based on the questions 'Does your birthday fall in the first quarter of the year' and 'Does your matriculation number end in 1, 2 or 3?'. We can infer the prevalence of the former by looking at the distribution of births statistics obtained from the federal statistical office, and for the latter we simply calculated the frequencies from the course registration database. In our case this translates to $p^w = 0.24816$ and $p^w = 0.333$.

The response rule for CM is to choose A if the answer is the same for both questions (Yes or No, for both) and B if only one answer is Yes (and the other is No). Because no one can determine which of the items the respondent answered with Yes or No, privacy remains protected. These prevalence probabilities are then included in the maximum likelihood estimate according to Yu, Tian, and Tang (2008) as follows:

$$\pi = \frac{\lambda + p^w - 1}{2p^w - 1}$$

where π is the frequency of the sensitive item and λ is the frequency of the respondents answering with A, i.e. both answers are the same. With a variance of

$$\mathrm{Var}(\pi) = \frac{\lambda(1-\lambda)}{n(2p^w - i)^2}$$

we provide the prevalence of dishonest behaviour for each type of treatment individually and infer whether prevalence levels reported differ across treatments (Jann 2011; Jann, Jerke, and Krumpal 2011).

IV. Results

We received 144 responses that we used in our final analysis. We have 77 and 67 respondents in the sensitive treatment groups, and all respondents received the direct questions and the crosswise questions. To avoid tiring respondents through repetition of the same questions for all three techniques, we used slightly different questions that each elicits a similar behaviour. For the crosswise elicitation, we focus on 'fare dodging' and 'plagiarism' only.

[1]The university itself has an active research profile and the corresponding department reports many well-published publications from well-known academics. None of the involved authors is currently affiliated with this respective university.

Table 1 reports the prevalence of deceitful behaviour as elicited through different (IS and crosswise) techniques. The table also reports the extent reported from direct questions. These are then used to calculate the differences in prevalence levels across the different techniques employed. Our results show that the prevalence of deceitful behaviour using the IS techniques ranges between 34% and 41% for the two treatments that elicit whether or not people would have returned undeserved money and whether or not they have dodged a public transport fee. Both effects are significant at the 5% level. Yet, the level of plagiarism reported is surprisingly small and not statistically significant. For the direct question, we find that the level of deceitful behaviour is comparable (35.4) for the 'undeserving money' treatment.

For the 'dodging of public fees' treatment, we can infer that the direct questioning (in comparison to crosswise modelling) reveals a significant, yet smaller percentage of deceitful behaviour (30.8), while the 'plagiarism' treatment indicates a higher proportion of deceit (24.3). In both treatments, plagiarism and dodging public fares, CM reports significantly higher levels of deceit. Under the assumption that more deceitful behaviour revealed is better (in a statistical sense), CM reveals the highest level of deceit in respondents and, hence, performs the best.

As a main contribution of the article, we present evidence on crosswise elicitation for the 'dodging of public fees' treatment and the 'plagiarism' treatment against the benchmark results. The analysis reveals that in both treatments the percentage of deceit reported increases substantially. The coefficients lie well above the prior levels reported (60.4 and 58.3 for dodging and plagiarism, respectively). Hence, under the assumption that more deceit reported is better, the CM is able to elicit the highest levels of wrongdoings among study participants. The difference in both CMs is statistically significant (0.34 and 0.29 for plagiarism and fare dodging, respectively). For plagiarism, the CM also reports a much higher prevalence than the IS technique (0.45), while for fare dodging it reports a higher prevalence, which is, however, not significant at conventional levels.

V. Conclusion

In this work, we investigated the prevalence of deceitful behaviour on a sample of first-semester students. As opposed to prior studies that by and large elicit deceit using laborious experimental design to uncover petty crimes, we ask respondents direct questions about their misconduct. In doing so, we also compare several techniques to elicit deceitful behaviour comprising IS, crosswise, and direct questioning techniques: in sum, techniques that ensure respondent anonymity and are better suited to receive truthful replies on deceit from respondents.

Our results reveal that the prevalence of petty crimes is around 70% in our sample. We find that CMs that mix deceitful with innocuous answers perform best in terms of eliciting wrongdoings. IS techniques do not perform better than simply direct questions for reporting the prevalence of deceitful behaviour. Randomized response techniques relying on IS techniques suffer the problem that they might be difficult to understand and that not guilty respondents (as opposed to guilty respondents in other techniques) protect themselves by not giving 'yes' answers to some of the nonsensitive questions. Hence, in IS techniques the underreporting of innocuous responses complicates the estimation of deceit.

We believe that CMs can be widely used to assess deceitful behaviour in large-scale samples for which experiments will become too costly to administer. Similarly, survey designs might shed light on the generalizability of previously documented deceit from experimental evidence to enlarge the evidence base and to replicate experimental findings in larger populations.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix

Table 1. Summary of techniques and estimation results.

	Returning undeserved money	Plagiarism	Dodging public utility fee
Level			
Item-sum (RR)	34.2*	12.4	40.9*
	(17.2)	(17.7)	(17.3)
Item-sum (DQ)	35.4***	29.9***	70.8***
	(4.0)	(3.8)	(3.8)
Crosswise model		58.3***	60.4***
		(8.3)	(12.5)
Crosswise model (DQ)		24.3***	30.8***
		(3.6)	(3.9)
Difference			
Item-sum (RR) – Item-sum (DQ)	−1.2	−17.5	−29.9
	(17.6)	(18.1)	(17.7)
Crosswise – Crosswise (DQ)		34.0***	29.6*
		(9.0)	(13.1)
Crosswise – Item-sum (RR)		45.9*	19.5
		(19.5)	(21.3)

N = 144, standard errors in parentheses. DQ: direct question; RR: randomized response

* $p < .05$, ** $p < .01$, *** $p < .001$

Survey questions

IS technique

IS questions 1:

- I have sold items on websites such as eBay.
- I am in favour of implementing the draft for women.
- I want to study at a different university after completing my bachelors.
- I have donated to a charity.

Sensitive question:

- I have plagiarized or copied texts for an assignment from the Internet without citing them correctly.

IS questions 2:

- I have one or more sibling(s).
- I have a subscription for a daily newspaper.
- I enjoy playing board games.
- I regularly use more than two social media services.

Sensitive question:

- I have used public transportation without a valid ticket.

IS questions 3:

- I have a driver's licence.
- I like drinking coffee or energy drinks.
- I prefer taking the bike instead of the car if I can.
- I brush my teeth at least twice a day.

Sensitive question:

- I have received too much change and did not rectify that error.

Crosswise model

Please select 'A' if the answers to both questions are the same (Yes|Yes or No|No) or 'B' if they are different (Yes|No or No|Yes).

Question 1:

Does your birthday fall in the first quarter of the year?

Did you use illicit resources during an exam or test?

Question 2:

Does your matriculation number end in 1, 2, or 3?

Are you dodging the obligatory television and radio licence fee, even though you should pay?

Direct Questions

- Did you use illicit resources during an exam or test?
- Are you dodging the obligatory television and radio licence fee, even though you should pay?
- Did you plagiarize or copy texts for an assignment from the Internet without citing them correctly?
- Did you ever use public transportation without a valid ticket?
- Did you ever receive too much change and did not rectify that error?